Presentation to the

USACE 2008 Planning Community of Practice

Digital Models to Predict, Assess, and Mitigate Shoreline Impacts to Archeological Sites on the Upper Mississippi River and Illinois Waterway

by

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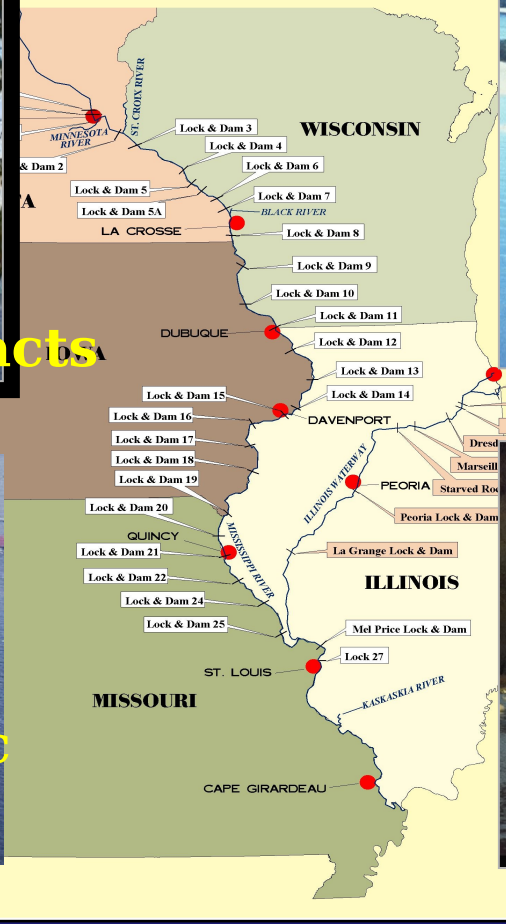
Upper Mississippi River System Navigation & Ecosystem Sustainability Program (NESP)

Systemic Impacts



Ecosystem Restoration Impacts

Site Specific Impacts

One Team: Relevant, Ready, Responsive and Reliable

Systemic Environmental Mitigation

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Increased Traffic =

- **Reduced habitat and abundance of aquatic life in backwaters and secondary channels**
- **Reduced abundance of fish in the main channel of the river**
- **Reduced growth of submersed aquatic vegetation in the main channel borders**
- **Reduced quality of riparian and bankline habitat**
- **Potential adverse effects on mussels**
- **Potential adverse effects to historic properties resulting from increased shoreline erosion**

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Upper Mississippi River Navigation & Ecosystem Sustainability Program (NESP)

Challenges

- 1200 miles of Upper Mississippi and Illinois River Shoreline
- 5 States
- Over 2000 Recorded Archeological Sites

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Where do you start?

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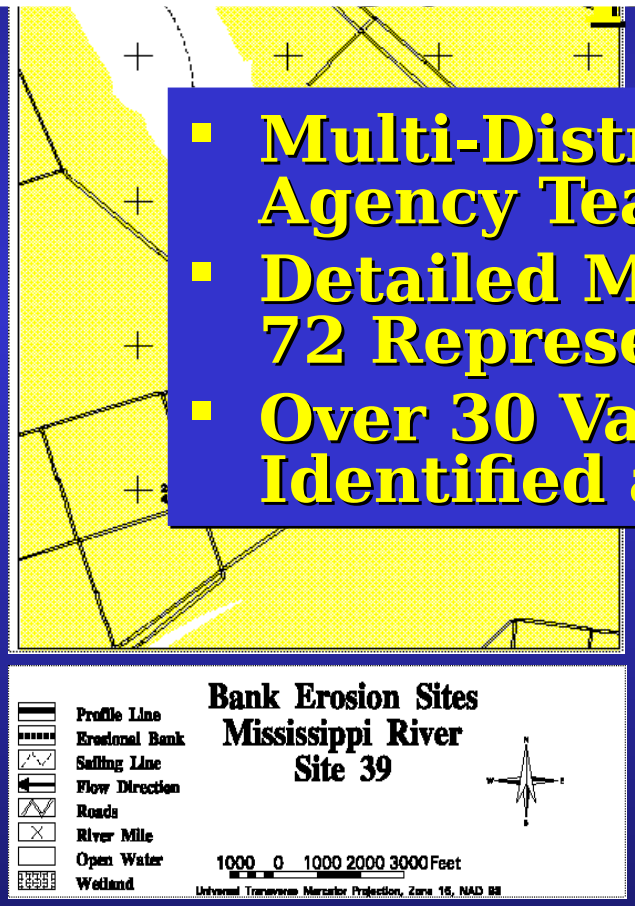
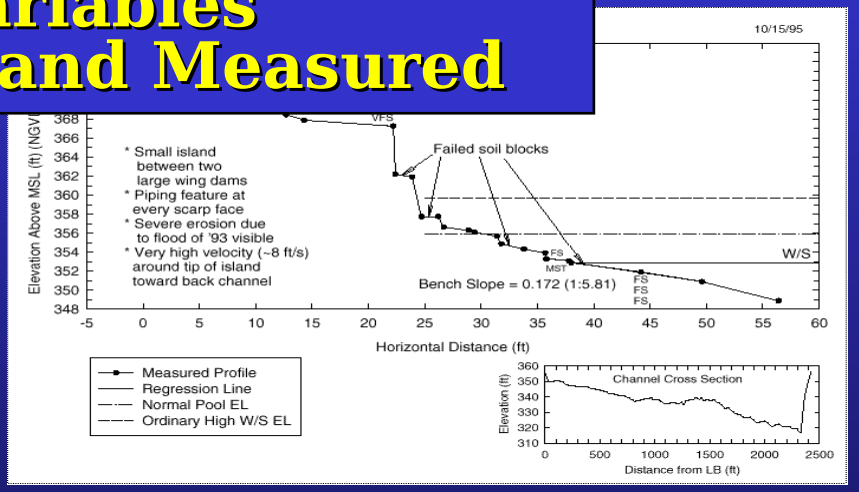
Bank Erosion Study: Detailed

43 Sites on the Mississippi River

29 Sites on the Illinois Waterway

- Multi-District Multi-Agency Team:
- Detailed Measurements at 72 Representative Sites
- Over 30 Variables Identified and Measured





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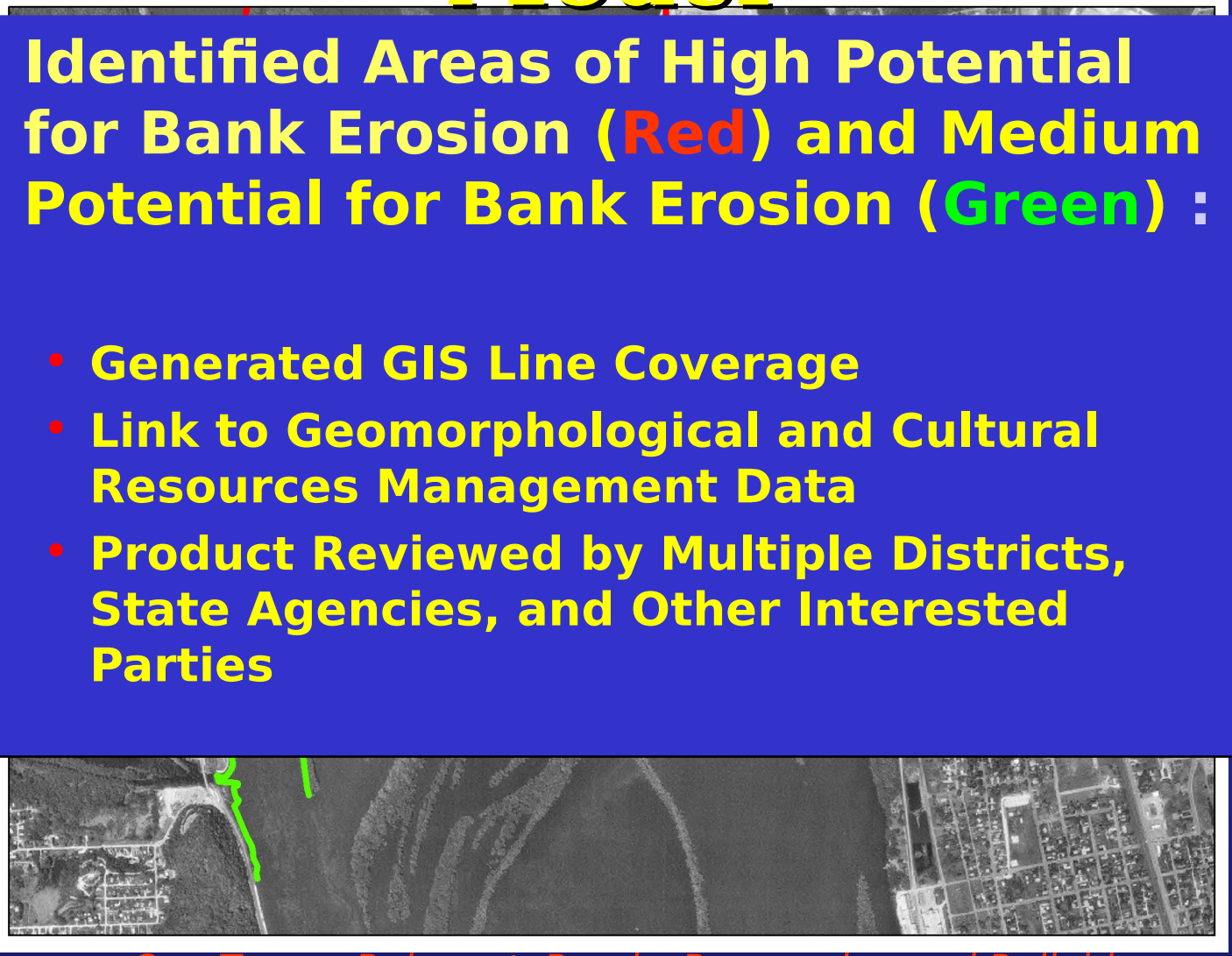
Bank Erosion Model

- **Identified Areas of High Potential for Bank Erosion (Red) and Medium Potential for Bank Erosion (Green) :**
  - **Generated GIS Line Coverage**
  - **Link to Geomorphological and Cultural Resources Management Data**
  - **Product Reviewed by Multiple Districts, State Agencies, and Other Interested Parties**



LSA Data

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- GIS Polygon Data for the UMR in
  - MVP, MVR, and part of MVS
- GIS Polygon Data for the IWW
- Parameters Include Landscape,
  - LSA Unit, and Relative Age
- Made shapefiles available to Contractors and SHPOs
- Provided Training to IDIQ Contractors, District Staff, and SHPOs

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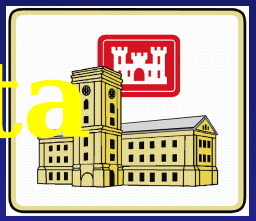
Cultural Resources Data

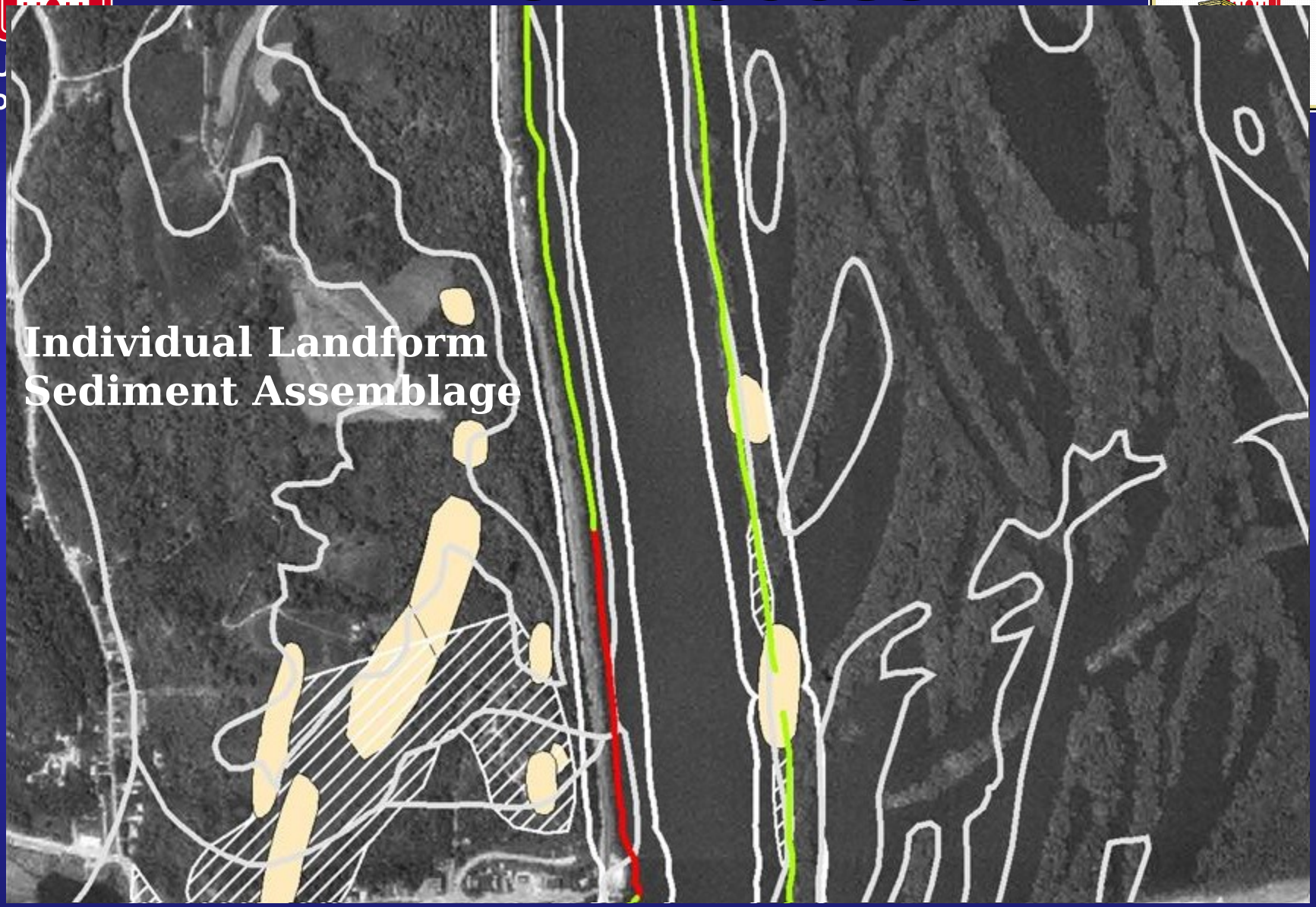


- **State Maintained Archeological Site and Survey GIS Datasets Obtained Via Formal Data-Sharing Agreements with Iowa, Illinois, and Missouri**

- **Linked to Historic Properties Management Plans (HPMP) and Bank Erosion Data**

- **Over 80 HPMP Parameters Identified for Each Site Including Land Use, Ongoing and Potential Impacts, and NRHP Eligibility**

The Process



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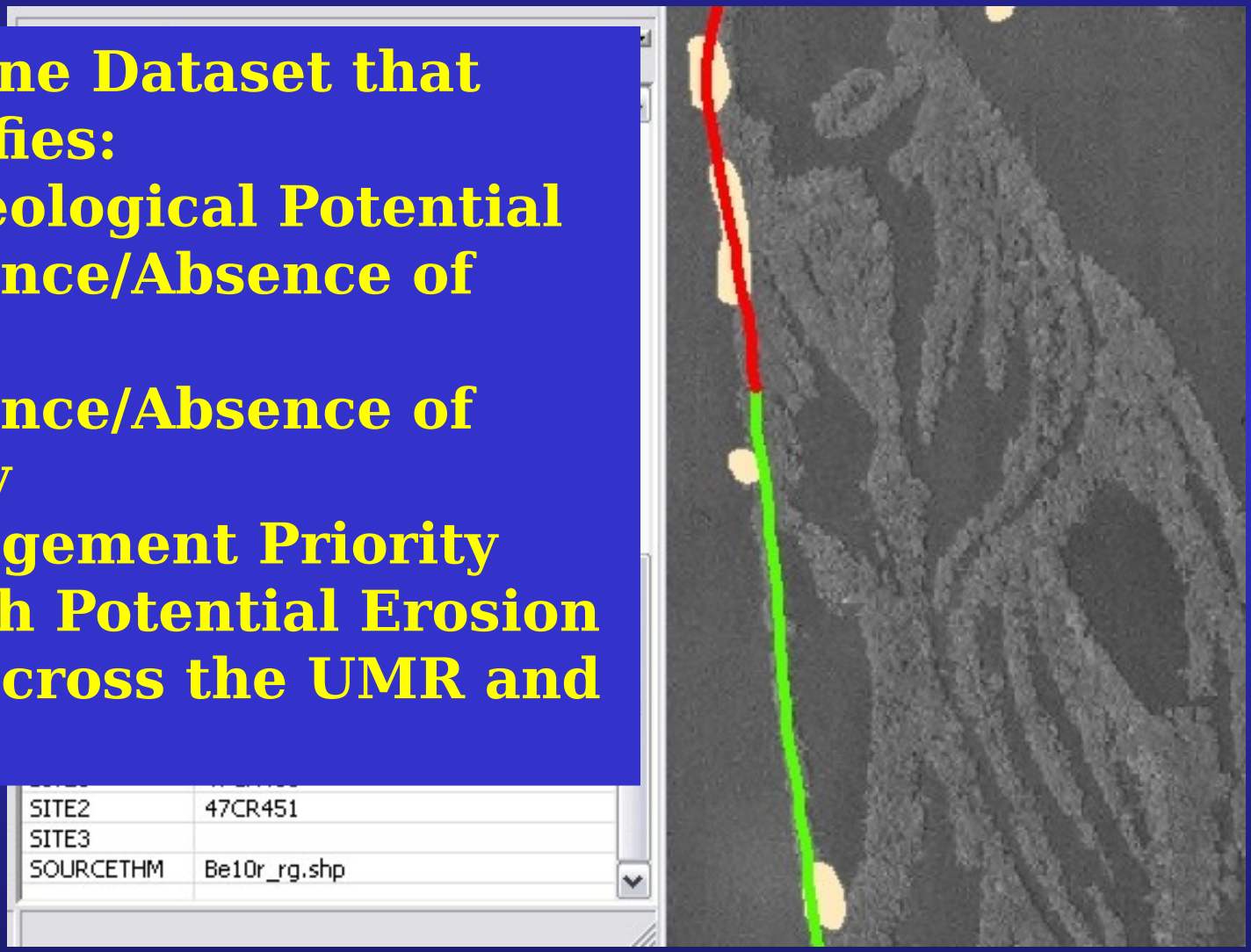
Result

GIS Line Dataset that Identifies:

- **Archeological Potential**
- **Presence/Absence of Sites**
- **Presence/Absence of Survey**
- **Management Priority of Each Potential Erosion Area across the UMR and IWW**



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Result

- **Reduced the Systemic Area of Potential Effect from 1200 Miles of Shoreline to:**
  - **19 miles of shoreline adjacent to NRHP listed/eligible archeological sites**
  - **67 miles of shoreline associated with high or moderate potential for unrecorded archeological sites**

ARCHEOLOG POTENTIA	IR AL	TOTAL
High	61	47453
Medium	58	98155
Low	779	248461
None	8	26349
TOTAL	206	420418

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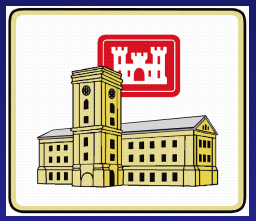
Projected Systemic Mitigation Tasks/Costs



PROJECTED MITIGATION MEASURES	PROJECTED MITIGATION COSTS Amount*	Per Unit Cost	TOTAL
Systemic Mitigation			
Archeological Site Monitoring	100 sites	$2K/site	200
Archeological Survey	2500 ac	$20K/100 ac	500
Archeological Testing	80 sites	$20K/site	1600
Limited Data Recovery	42 sites	$150K/site	6300
SubTotal			8600

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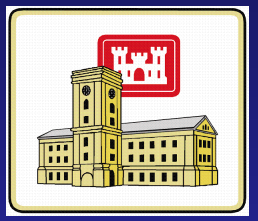
Final Thoughts



Cultural Resources Planning for this Project:

- **Involved review agencies (SHPOs and Advisory Council) and Tribes early and often in the PA development, digital data development, and review process;**
- **Provided training to SHPOs, consultants, and District staff in use of LSA tool for impact assesment;**
- **Resulted in mutually agreeable method of determining project impact, mitigation, and cost.**

Questions?

Artwork provided to the Rock Island District courtesy of Michael Blaser

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